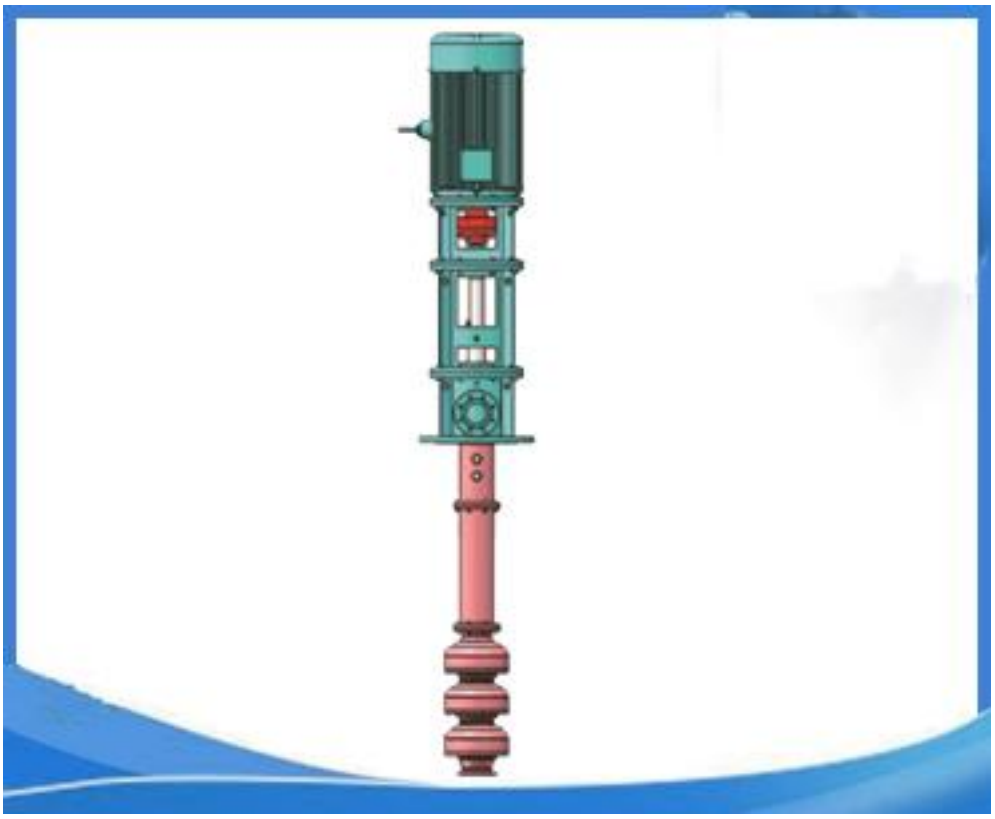
High Temperature High Lift Molten Salt Pump



I. Main features:

GRY series molten salt pump, combined more than 20 years of pump produce experience and advanced technology abroad, is a kind of high temperature, high lift molten salt pump with large flow, high lift and high temperature resistance. It is widely used in medicine, photovoltaic power generation, chemical and metallurgy industries.

GRY series molten salt pump is mainly used in high temperature, high lift molten salt forced circulation, or other high temperature liquid containing no solid particles. Which has the advantages of wide application range, high temperature resistance, large flow rate, high efficiency, stable operation and long service life.

This series of high temperature molten salt pump, the maximum lift to 120m; flow from 5cbm/h to 1000cbm/h; using temperature can reach 560℃; the flow part adopts multistage guide shell structure to make the fluid parameters of the pump more reasonable, so as to ensure the high efficiency of pump operation. There is also a significant advantage of the structure is that the operation of the pump shaft does not produce radial force to ensure smooth operation of the pump, long service life.

Pump material: heat resistant steel, heat-resistant alloy steel, stainless steel, to meet the different requirements of the use of temperature and process; pump rotor rotating sealing parts and rotating supporting parts are of high temperature wear-resistant alloy material, to ensure a reliable and long-term use under high temperature.

II. Model explain, take model 32GRY5-20-2 as an example,

32: outlet diameter
5：flow 5cbm/h
2: number of stage

GRY: high temperature molten salt pump
20: single stage head

III. Technical parameters

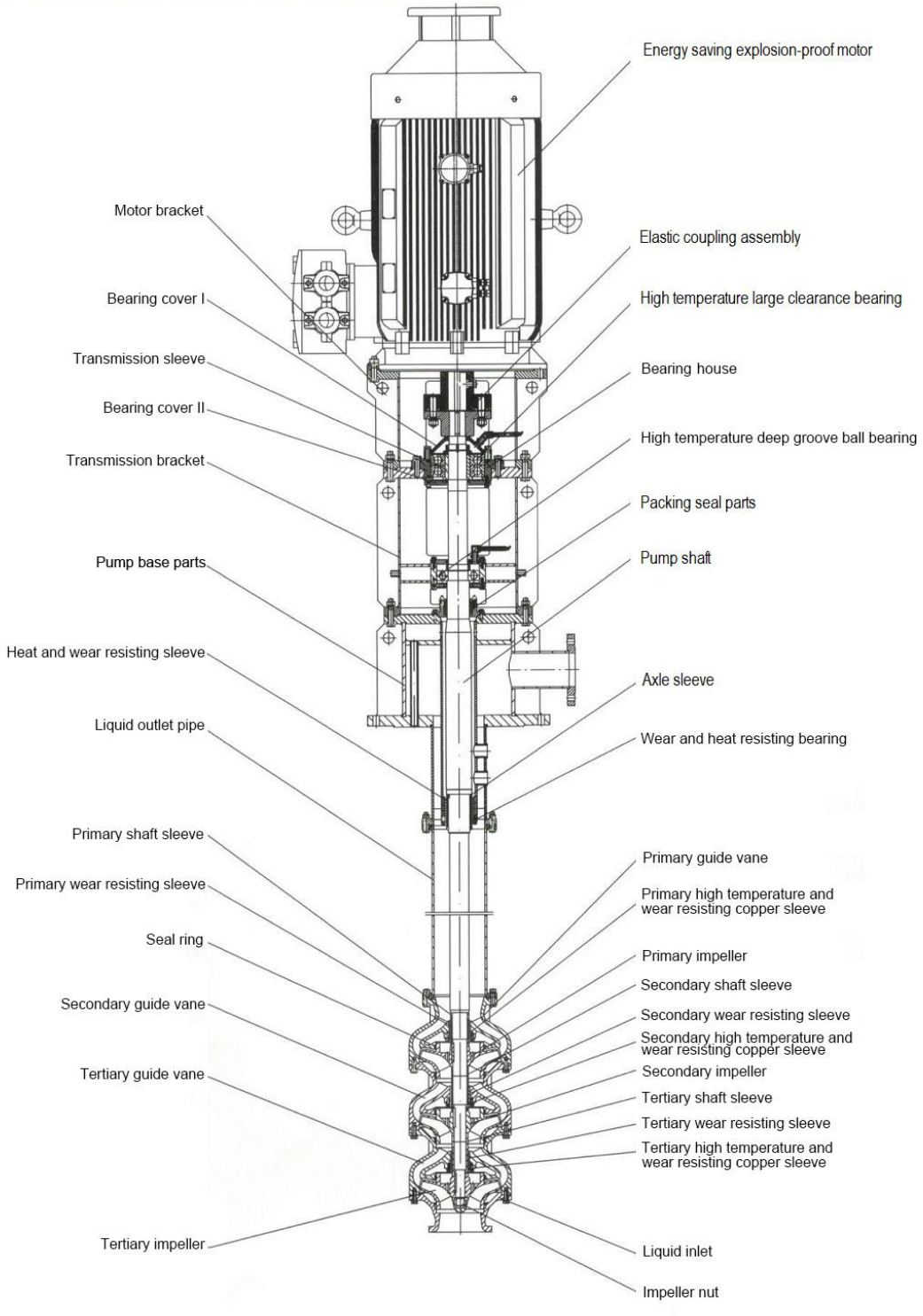
Model	**Flow**		**Lift**	**Efficiency**	**Rotate speed**	**Power**	**Molten salt power**
	Cbm/h	**l/s**	**H (m)**	**%**	**r/min**	**kW**	**kW**
32GRY5-20-1	3.5 5 6.5	0.97 1.39 1.81	24 20 15	33 37 34	2900	1.5	2.2
32GRY5-20-2	3.5 5 6.5	0.97 1.39 1.81	48 40 30	33 37 34	2900	2.2	4.0
32GRY5-20-3	3.5 5 6.5	0.97 1.39 1.81	72 60 45	33 37 34	2900	3.0	5.5
32GRY5-20-4	3.5 5 6.5	0.97 1.39 1.81	96 80 60	33 37 34	2900	4.0	7.5
32GRY10-15-1	7.0 10 13	1.94 2.78 3.61	18.5 15 12.3	40 43 39.3	1450	2.2	3.0
32GRY10-15-2	7.0 10 13	1.94 2.78 3.61	37 30 24.5	40 43 39.3	1450	3.0	5.5
32GRY10-15-3	7.0 10 13	1.94 2.78 3.61	55.5 45 37	40 43 39.3	1450	4.0	7.5
32GRY10-15-4	7.0 10 13	1.94 2.78 3.61	74 60 49.2	40 43 39.3	1450	5.5	11.0
32GRY30-20-1	21 30 39	5.83 8.33 10.8	24 20 16.5	50 55 51	1450	4.0	7.5
32GRY30-20-2	21 30 39	5.83 8.33 10.8	48 40 33	50 55 51	1450	7.5	15.0
32GRY30-20-3	21 30 39	5.83 8.33 10.8	72 60 49.5	50 55 51	1450	11.0	22.0

32GRY30-20-4	21 30 39	5.83 8.33 10.8	96 80 66	50 55 51	1450	15.0	30.0
80GRY50-25-1	37.5 50 62.5	10.42 13.89 17.36	29.5 25 21.5	53 58 54	1450	7.5	15
80GRY50-25-2	37.5 50 62.5	10.42 13.89 17.36	59 50 43	53 58 54	1450	15	30
80GRY50-25-3	37.5 50 62.5	10.42 13.89 17.36	88.5 75 64.5	53 58 54	1450	22	45
80GRY50-25-4	37.5 50 62.5	10.42 13.89 17.36	118 100 86	53 58 54	1450	30	55
100GRY80-27.5-1	60 80 100	16.67 22.22 27.78	31 27.5 23	61 55 62	1450	11	22
100GRY80-27.5-2	60 80 100	16.67 22.22 27.78	62 55 46	61 55 62	1450	22	45
100GRY80-27.5-3	60 80 100	16.67 22.22 27.78	93 82.5 69	61 55 62	1450	37	75
250GRY600-40-1	510 600 690	141.67 166.67 191.67	43 40 36.5	77 81 79	1450	110	185
250GRY600-40-2	510 600 690	141.67 166.67 191.67	86 80 73	77 81 79	1450	210	315
300GRY800-40-1	640 800 960	177.78 222.22 266.67	46 40 33.5	76 82 77	1450	130	220
300GRY800-40-2	640 800 960	177.78 222.22 266.67	92 80 67	76 82 77	1450	260	400
350GRY1000-40-1	800 1000 1200	222.22 277.78 333.33	45 40 35	78 83 80	1450	160	285
350GRY1000-40-2	800 1000 1200	222.22 277.78 333.33	90 80 70	78 83 80	1450	320	500

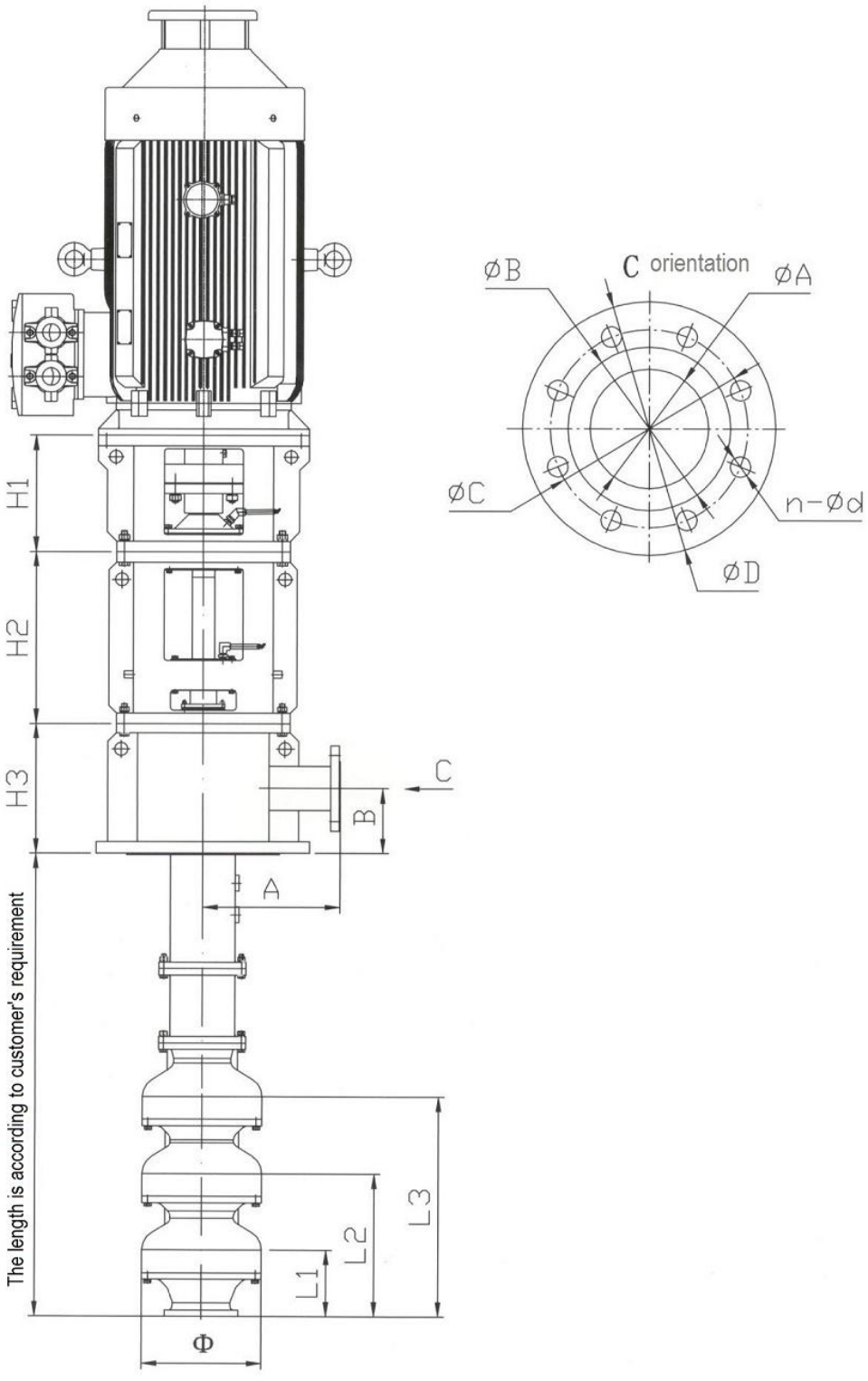
IV. Structure

The main components are: liquid inlet, diversion shell, the liquid outlet pipe, impeller, pump shaft, sealing ring, wear - resistant sliding bearing, sleeve, sealing tube, pump seat, motor bracket, bracket, couplings, bearings, heat and wear large clearance of bearings and other parts. Please see the following figure:

VI. GRY Series High temperature high lift molten salt liquid pump structure diagram



V. Outline drawing



VI. Assembly

1. Component assembly

1) Bearing house assembly: Clean bearing, fit two sets angular contact ball bearing to the drive sleeve, lock with lock nut, and then put the bearing and drive sleeve into the bearing house.
2) Bracket assembly: Clean the bracket, fit the bracket into filler seal house, fasten with bolts, and then fit filler and filler cover. Notes, cover not pressed.
3) Pump shaft assembly: Load the bearing (high temperature resistant large clearance deep groove bearing) on the pump shaft, and lock with nut.
4) Diversion shell assembly: Clean the diversion house, press seal ring into the house, load sliding bearing and then fasten with bolts.

2. Assembly

Load the assembled pump shaft into the bracket. When assembled, the filler cover, bearing upper cover and bearing lower cover should be properly arranged; load the bearing house into the pump shaft and bracket; install the pump base, liquid outlet pipe and middle sliding bearing; install diversion shell components, impeller and wear sleeve; install impeller nut and liquid inlet; and then install coupling, motor bracket, motor, etc.; At last, adjust the filler compaction degree, assembly complete.

VII. Disassembly

Remove motor, lift the pump as a whole. Remove the liquid inlet and impeller nut; remove the impellers, wear sleeve and diversion shell; remove liquid pipe and middle sliding bearing; remove motor bracket and coupling components; extract the pump shaft and remove its shaft sleeve and bearing; remove the sliding bearing and seal ring from the diversion shell.

VIII. Maintance and notes

1. Use and Maintance

1) Before commissioning, check the clearance between the motor and coupling, make sure it's between 3mm to 6mm. Large pump to take large values, small pump to take small. Make sure that there is no contact between the two couplings.
2) Turning by hand before commissioning, the rotation should be uniform and flexible.
3) Before the first starting up, inject high temperature resistant grease into the bearing house. Normal work, once every 7 to 10 days. Recommended use Mobil XHP-222 high temperature resistant grease.
4) When the pump is in the same direction as the pump rotation, it can operate. When testing the rotation direction, test with a point moving mode.
5) Before starting up, fill water to the bearing cooling house, cooling 15 minutes before starting the pump. Pump operation, the bearing cooling house should always pass through the cooling water, cooling water pressure from 0.2MPa to 0.4Mpa.
6) Pay attention to the motor current changes, when the current fluctuations, the change more than 5%, should stop to check.

2 Notes

1) The sliding bearing clearance is designed according to the state of high temperature molten salt. If you have to test the water at room temperature, the proposed time is not too long (It's better less than half an hour). Under the condition of normal temperature water, if the running time is too long, it will seriously affect the smooth operation and service life of the pump.

2) Before starting up, firstly fill cooling water. When shutdown, first stop the pump and then cut off the water supply. If no cooling water or cooling water prssure shortage, it will damage to pump.
3) Incorrect installation of pump set or improper arrangement of pump pipe will affect the smooth operation and service life of the pump.
4) If the supply voltage is not up to the requirement of the state, it will affect the pump working performance and motor service life.
5) If the pump abnormal or vibration, please stop and check it. Find out the cause and troubleshooting, and then restart up.
6) Only molten salt temperature reaches the corresponding value, can start up the pump. Temperature is too low, will cause the damage to pump or motor. Normally, the lowest temperature is 200℃.

IX. Common faults and troubleshooting

Faults	Causes	Troubleshooting
Over Current	1.Overload 2.Tight clearance of sliding bearing 3.System matching unreasonable	1.Reduce the impeller diameter 2. Change the clearance of sliding bearing, or run a period of time naturally smaller 3.Matching adjustment
Large pump vibration or friction	1.Small clearance between impeller and sealing ring 2.Sliding bearing excessive wear 3.Impeller balance is not good 4.Lower liquid level 5.Pump house and bracket deformation	1.Adjust clearance 2.Change the sliding bearing 3.Correcting impeller balance 4.Add molten salt 5.Remove and correcting deformation
Large current fluctuation	1.Impeller friction 2.The system is unstable 3.Lower liquid level	1.Adjust impeller clearance 2.Adjust system condition 3.Add molten salt
High temperature of drive bearing	1.Poor cooling 2.Improper choice of lubricant 3.Friction in rotating parts	1.Change the cooling condition 2.Change into high temperature resistant lubricant 3.Correcting rotating parts